

CLAIMS

What is claimed is:

1. A medical device for implanting in a patient comprising a ceramic component disposed on the surface of the medical device
2. The medical device of claim 1 wherein the ceramic component comprises a porous region.
3. The medical device of claim 2 further comprising at least one attachment region disposed within or on the surface wherein the ceramic component is disposed on or within the attachment region.
4. The medical device of claim 3 further comprising a second porous region wherein the second porous region is less porous than the first and wherein the ceramic component connects to at least one attachment region through the second porous region.
5. The medical device of claim 4 wherein the ceramic component is fused to the surface of at least one attachment region through the second porous region.
6. The medical device of claim 4 further comprising an oxide layer disposed between the surface of at least one attachment region and the second porous region.
7. The medical device of claim 1 wherein the porous region releasably contains a drug.
8. The medical device of claim 7 wherein the drug comprises at least one of a smooth-muscle-cell vascular activity inhibitor, a wound healing enhancer, an agent for improving the structural properties in a vascular site, an agent for improving the elastic properties of a vascular site, an antineoplastic substance, an anti-inflammatory substance, an antiplatelet substance, an anticoagulant substance, an antifibrin substance, an antithrombin substance, an antimitotic substance, an antibiotic substance, an antiallergy

substance, an antioxidant substance, alpha-interferon, genetically engineered epithelial cells, rapamycin, actinomycin D, paclitaxel or docetaxel.

9. The medical device of claim 2 further comprising a polymer layer over the ceramic component, over a portion of the medical device not including the ceramic component, or both.
10. The medical device of claim 4 further comprising an auxiliary component with at least one auxiliary-component attachment region disposed in or on the surface of the auxiliary component and wherein the ceramic component is disposed on or within at least one auxiliary-component attachment region.
11. The medical device of claim 10 further comprising a third porous region disposed in the ceramic component wherein the third porous region is less porous than the first and wherein the ceramic component connects to at least one auxiliary-component attachment region through the third porous region.
12. The medical device of claim 11 wherein the ceramic component is fused to at least one auxiliary-component attachment region through the third porous region.
13. The medical device of claim 11 further comprising a second oxide layer disposed between the third porous region and at least one auxiliary-component attachment region.
14. The medical device of claim 11 wherein the surface or auxiliary-component surface, or both, comprise a metal, glass, or ceramic.
15. The medical device of claim 14 wherein metal comprises iron, cobalt, nickel, manganese, stainless steel, tantalum, niobium, super-elastic nickel-titanium alloys, titanium, silver, gold, platinum, steel, or aluminum.
16. The medical device of claim 14 wherein glass comprises borosilicate glass, lead glass, soda glass, uranium glass, soft glass, fused quartz, or fused silica.

17. The medical device of claim 14 wherein ceramic comprises carbide ceramics, oxide ceramics, nitride ceramics, or boride ceramics.
18. The medical device of claim 17 wherein ceramic comprises titania, zirconia, hafnia, silica, alumina, silica alumina, silicon carbide, tungsten carbide, silicon boronitride, boronitride, silicon, or gallium arsenide.
19. The medical device of claim 10 wherein the auxiliary component is one of an electrode, a physical sensor, or a chemical sensor.
20. The medical device of claim 10 further comprising a polymer layer disposed over the auxiliary component, over a portion of the medical device not including the auxiliary component, or both.
21. The medical device of claim 10 wherein the medical device is a stent.
22. The medical device of claim 1 wherein the surface of the medical device comprises plastic, metal, glass, or ceramic.
23. The medical device of claim 22 wherein metal comprises iron, cobalt, nickel, manganese, stainless steel, tantalum, niobium, super-elastic nickel-titanium alloys, titanium, silver, gold, platinum, steel, or aluminum.
24. The medical device of claim 22 wherein glass comprises borosilicate glass, lead glass, soda glass, uranium glass, soft glass, fused quartz, or fused silica.
25. The medical device of claim 22 wherein ceramic comprises carbide ceramics, oxide ceramics, nitride ceramics, or boride ceramics.
26. The medical device of claim 25 wherein ceramic comprises titania, zirconia, hafnia, silica, alumina, silica alumina, silicon carbide, tungsten carbide, silicon boronitride, boronitride, silicon, or gallium arsenide.

27. A medical device for implanting in a patient comprising:
 - a) a surface comprising a metal;
 - b) at least one attachment region disposed in or on the surface;
 - c) a ceramic component comprising a glass or ceramic, the ceramic component having a first porous region and a second less porous region, wherein the less porous region side of the ceramic component is fused on or within the attachment region; and
 - d) an oxide layer disposed on or within the attachment region between the surface of the device and the ceramic component.
28. The medical device of Claim 27 wherein the medical device is a stent.
29. The medical device of Claim 27 further comprising a drug releasably disposed in the first porous region.
30. A method of preparing a medical device comprising:
 - a) preparing at least one attachment region on or within the surface of a base medical device;
 - b) applying a ceramic-component precursor to the attachment region; and
 - c) converting the ceramic-component precursor into a ceramic component.
31. The method of claim 30 further comprising forming an oxide layer on or within at least one attachment region before the step of applying a ceramic-component precursor.
32. The method of claim 30 further comprising machining the base medical device, the surface of the base medical device, or a portion of the base medical device so that the base medical device, the surface of the base medical device, or a portion of the base medical device is thermally compatible with a ceramic component.

33. The method of claim 30 further comprising the step of fusing the ceramic component to the attachment region.
34. The method of Claim 33 further comprising the step of fusing the ceramic component to the oxide layer.
35. The method of claim 30 wherein the step of preparing at least one attachment region in the surface uses a means for machining.
36. The method of claim 35 wherein the means for machining is laser ablation.
37. The method of claim 30 wherein the attachment region is prepared in the surface using a laser.
38. The method of claim 30 wherein converting the precursor into a ceramic component comprises heating the precursor and, optionally, at least a portion of the base medical device.
39. The method of claim 38 wherein the step of heating the precursor uses a means for heating.
40. The method of claim 39 wherein a means for heating is selected from furnaces, radiating heat sources, hydrogen furnaces, high-voltage DC arc current sources, or lasers.
41. The method of claim 38 wherein the ceramic component precursor is heated using a laser.
42. The method of claim 30 further comprising optionally preparing at least one attachment region on or within the surface of an auxiliary component and adhering the ceramic component into or onto the auxiliary-component attachment region.

43. The method of claim 42 further comprising forming an oxide layer on or within at least one auxiliary-component attachment region before the step of adhering the ceramic component.
44. The method of claim 30 wherein the ceramic component comprises a porous region.
45. The method of claim 44 wherein the porous region contains a drug.
46. The method of claim 45 further comprising the step of applying a polymer layer over the auxiliary component, over a portion of the base medical device not including the auxiliary component, or both.